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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,437	12/10/2001	Nader Dutta	594-25576	5333

7590 06/07/2006

Jeffrey E. Griffin
WesternGeco Intellectual Property Department
10001 Richmond Ave.
Houston, TX 77042

EXAMINER	
JONES, HUGH M	

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 06/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/016,437	DUTTA ET AL.	
	Examiner	Art Unit	
	Hugh Jones	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 December 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/10/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-27 of U. S. Application 10/016,437, filed 12/10/2001, are presented for examination.

Information Disclosure Statement

2. Applicants are thanked for the information disclosure statement.

Drawings

4. Applicants are thanked for their amendment.

5. Figure 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. For example, see fig. 1 of de Kok (IDS of 5/10/2006 – search report of 5/23/2003).

Oath/Declaration

6. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is

required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because: the affidavit raises a question about the inventorship. Clarification is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (f) he did not himself invent the subject matter sought to be patented.

8. Claims 1-27 are rejected under 35 U.S.C. 102(f) because the applicant did not invent the claimed subject matter. See the statements in the affidavit.

9. Claims 1-27 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Mallick (6/2001).

10. Mallick (one of the inventors) discloses prestack waveform inversion using a genetic algorithm including:

a method for determining shallow water flow risk using seismic data comprising (abstract; SWF – pg. 81, col. 2; page 82, col. 1; fig. 12):

processing the seismic data to enhance its stratigraphic resolution ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82);

selecting a control location comprising:

performing a stratigraphic analysis on the seismic data (abstract; "Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82; pg. 80, col. 2); and

evaluating the seismic attributes of the seismic data ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82);

applying a pre-stack waveform inversion on the seismic data at a selected control location to provide an elastic model, wherein the elastic model comprises pressure-wave velocity and shear-wave velocity ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82); and

applying a post-stack inversion on the seismic data using the elastic model ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82); and determining the shallow water flow risk using the post-stack inverted elastic model to compare the pressure-wave velocity to the shear-wave velocity ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82).

wherein the pre-stack waveform inversion comprises using a genetic algorithm comprising:

generating a plurality of elastic earth models (pg. 79),

generating pre-stack synthetic seismograms for the elastic earth models (pg. 79);

matching the generated seismograms with the seismic data ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82);

generating a fitness for the elastic earth models (pg. 79);

genetically reproducing the elastic earth models using the fitness for the elastic earth models (pg. 79), and

determining convergence of the reproduced elastic earth models to select the elastic model ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82),

wherein processing the seismic data comprises using an algorithm with amplitude preserving flow (bottom of col. 2, page 81),

wherein the elastic model further comprises attribute of Poisson's ratio (fig. 10),

wherein the control location comprises a plurality of control locations (pg. 81; "Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82),

wherein performing the stratigraphic analysis comprises using the model to identify a geologic feature ("Prestack Waveform Inversion" and "Applications of Prestack Waveform Inversion" pp. 79-82),

wherein evaluating seismic attributes comprises using AVO techniques (abstract; pg. 80, col. 2).

11. Claims 1-5, 7-27 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by de Kok (PCT search report, 2003; including one of the inventors.).

12. de Kok discloses prestack waveform inversion using a genetic algorithm including:

a method for determining shallow water flow risk using seismic data comprising:

processing the seismic data to enhance its stratigraphic resolution (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

selecting a control location comprising:

performing a stratigraphic analysis on the seismic data (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7); and

evaluating the seismic attributes of the seismic data (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

applying a pre-stack waveform inversion on the seismic data at a selected control location to provide an elastic model, wherein the elastic model comprises pressure-wave velocity and shear-wave velocity (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7); and

applying a post-stack inversion on the seismic data using the elastic model ; and determining the shallow water flow risk using the post-stack inverted elastic model to compare the pressure-wave velocity to the shear-wave velocity (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7).

wherein the pre-stack waveform inversion comprises using a genetic algorithm comprising:

generating a plurality of elastic earth models (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

generating pre-stack synthetic seismograms for the elastic earth models (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

matching the generated seismograms with the seismic data (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

generating a fitness for the elastic earth models (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

genetically reproducing the elastic earth models using the fitness for the elastic earth (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7), and

determining convergence of the reproduced elastic earth models to select the elastic model (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein the elastic model further comprises attribute of Poisson's ratio (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein the control location comprises a plurality of control locations (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein performing the stratigraphic analysis comprises using the model to identify a geologic feature (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein evaluating seismic attributes comprises using AVO techniques (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7).

a method for determining shallow water flow risk using seismic data comprising:

processing the seismic data to enhance its stratigraphic resolution (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

selecting a control location comprising:

performing a stratigraphic analysis on the seismic data (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7); and

evaluating the seismic attributes of the seismic data (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

applying a pre-stack waveform inversion on the seismic data at a selected control location to provide an elastic model, wherein the elastic model comprises pressure-wave velocity and shear-wave velocity (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7); and

applying a post-stack inversion on the seismic data using the elastic model; and determining the shallow water flow risk using the post-stack inverted elastic model to compare the pressure-wave velocity to the shear-wave velocity (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7).

wherein the pre-stack waveform inversion comprises using a genetic algorithm comprising:

generating a plurality of elastic earth models (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

generating pre-stack synthetic seismograms for the elastic earth models (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

matching the generated seismograms with the seismic data (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

generating a fitness for the elastic earth models (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7);

genetically reproducing the elastic earth models using the fitness for the elastic earth models (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7), and

determining convergence of the reproduced elastic earth models to select the elastic model (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein processing the seismic data comprises using an algorithm with amplitude preserving flow (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein the elastic model further comprises attribute of Poisson's ratio (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein the control location comprises a plurality of control locations (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7),

wherein performing the stratigraphic analysis comprises using the model to identify a geologic feature (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7).

wherein evaluating seismic attributes comprises using AVO techniques (sections entitled method, Shallow waterflow detection, and Conclusion. Note fig. 1-2, 7).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 1-5, 7-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mallick (3/1999) in view of Huffman.

16. Mallick discloses all limitations, as subsequently discussed, but does not expressly disclose the application of the technique to Shallow Water Flow (SWF).

17. Huffman discloses a method for identification of shallow water flow hazards using seismic data (see title), using the same types of techniques.

18. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Mallick teaching to include the Huffman teaching because Huffman disclose in the "background of the art" that there is a need to identify SWF prior to drilling a borehole.

19. Specifically, Mallick discloses:

a method for determining shallow water flow risk using seismic data comprising ("Genetic Algorithm – a Practical Implementation – pp. 326-330):

processing the seismic data to enhance its stratigraphic resolution ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

selecting a control location comprising:

performing a stratigraphic analysis on the seismic data ("Genetic Algorithm – a Practical Implementation – pp. 326-330); and

evaluating the seismic attributes of the seismic data ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

applying a pre-stack waveform inversion on the seismic data at a selected control location to provide an elastic model, wherein the elastic model comprises pressure-wave velocity and shear-wave velocity ("Genetic Algorithm – a Practical Implementation – pp. 326-330); and

applying a post-stack inversion on the seismic data using the elastic model; and determining the shallow water flow risk using the post-stack inverted elastic model to compare the pressure-wave velocity to the shear-wave velocity ("Genetic Algorithm – a Practical Implementation – pp. 326-330).

wherein the pre-stack waveform inversion comprises using a genetic algorithm ("Genetic Algorithm – a Practical Implementation – pp. 326-330) comprising:

generating a plurality of elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330),

generating pre-stack synthetic seismograms for the elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

matching the generated seismograms with the seismic data ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

generating a fitness for the elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330);

genetically reproducing the elastic earth models using the fitness for the elastic earth models ("Genetic Algorithm – a Practical Implementation – pp. 326-330), and

determining convergence of the reproduced elastic earth models to select the elastic model ("Genetic Algorithm – a Practical Implementation – pp. 326-330),

wherein processing the seismic data comprises using an algorithm with amplitude preserving flow ("Genetic Algorithm – a Practical Implementation – pp. 326-330),

wherein the elastic model further comprises attribute of Poisson's ratio (pg. 330, col. 2),

wherein the control location comprises a plurality of control locations (pg. 330),

wherein performing the stratigraphic analysis comprises using the model to identify a geologic feature ("Genetic Algorithm – a Practical Implementation – pp. 326-330).

wherein evaluating seismic attributes comprises using AVO techniques ("Genetic Algorithm – a Practical Implementation – pp. 326-330).

20. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mallick (3/1999) in view of Huffman and in further view of Tygel et al. *or* de Kok in view of Tygel et al..

21. Mallick *or* de Kok discloses all limitations, as discussed, but do not expressly disclose the use of amplitude preserving techniques.

22. Tygel et al. discloses the use of amplitude preserving techniques (page 945, top of middle column).

23. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Mallick or de Kok teaching to incorporate the Tygel et al. teaching because Tygel et al. disclose that the use of amplitude preserving techniques reduce the deleterious effects of aliasing (page 945, top of middle column), in the same context.

Response to Arguments

24. Applicant's arguments, filed 5/10/2006 have been carefully considered, but are not persuasive.

25. With respect to a "prior art" label, for the drawings, Applicants request that the Examiner point out the art that shows such figures. The Examiner again reminds Applicants that the prior art figures are disclosed in their earlier papers.

26. The affidavit is acknowledged. However, the rejection still remains for the following reasons. The affidavit raises the issue of whether the oath is defective (due to inventorship) and whether there are 102(f) issues. The affidavit states that the referenced paper discloses the subject matter recited in all the claims. However, the

inventive entity includes more than the one inventor. It also states that the author of the affidavit is ***an*** inventor of the same claims. Thus, the statements in the affidavit appear to be in conflict. The rejection will remain until the issues are resolved. In any case the inventive entity is not identical to the authorship of said paper. Clarification is required. A 1.105 requirement for information is not being made at this time. This discrepancy still remains. Applicants have only made unpersuasive arguments that authorship and inventorship are different. "To another" is the same whether "to another" are inventors or authors. Applicant's arguments against the 102(f) are based upon the same premise and therefore are not persuasive.

27. Applicants arguments relating to the 103 rejections are not persuasive. Applicants are again reminded that the Poisson's ratio is the well known ratio between pressure and shear waves. This ratio is disclosed in both references. For example, see left hand column, top of page 329 of Mallick (*one of the inventors*) and col. 6, lines 6-20, col, 6 of Huffman. The definition was attached to the previous action for Applicants convenience. Applicants were silent in response. In response to applicant's arguments against the references individually (Applicants merely recite limitations and allege that the recitations are not disclosed in the art), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

28. Any inquiry concerning this communication or earlier communications from the examiner should be:

directed to: Dr. Hugh Jones telephone number (571) 272-3781,

Monday-Thursday 0830 to 0700 ET,

or

the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 308-9051 (for formal communications intended for entry)

or (703) 308-1396 (for informal or draft communications, please label *PROPOSED* or *DRAFT*).

Dr. Hugh Jones

Primary Patent Examiner

May 28, 2006